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ABSTRACT

This booklet examines the role of women in an increasingly technology-based society. An introductory section outlines the logical relationship between women as consumption managers of food, clothing, and shelter needs and appropriate technology (AT) concerns. A second section, "Women's Place in Science and Technology," examines the reasons why few women, thus far, have been involved with AT. Sex role stereotypes regarding mathematics and science and traditional male control of certain technologies are cited. "Technology Necessary to Women's Autonomy" looks at the impact of high and low energy-intensive systems on women's social and economic role. "Appropriate Technology: A Male Enterprise" looks at the traditional focus of appropriate technologies on male technologies such as energy and transportation, rather than female technologies such as food preservation and clothing production. "A Case for Mutual Needs" considers whether the AT movement and the women's movement can work together. A five-part action plan is presented. A resource list and footnote section conclude the publication. (LP)

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Something Old, Something New
Something Borrowed, Something Due

Women and Appropriate Technology

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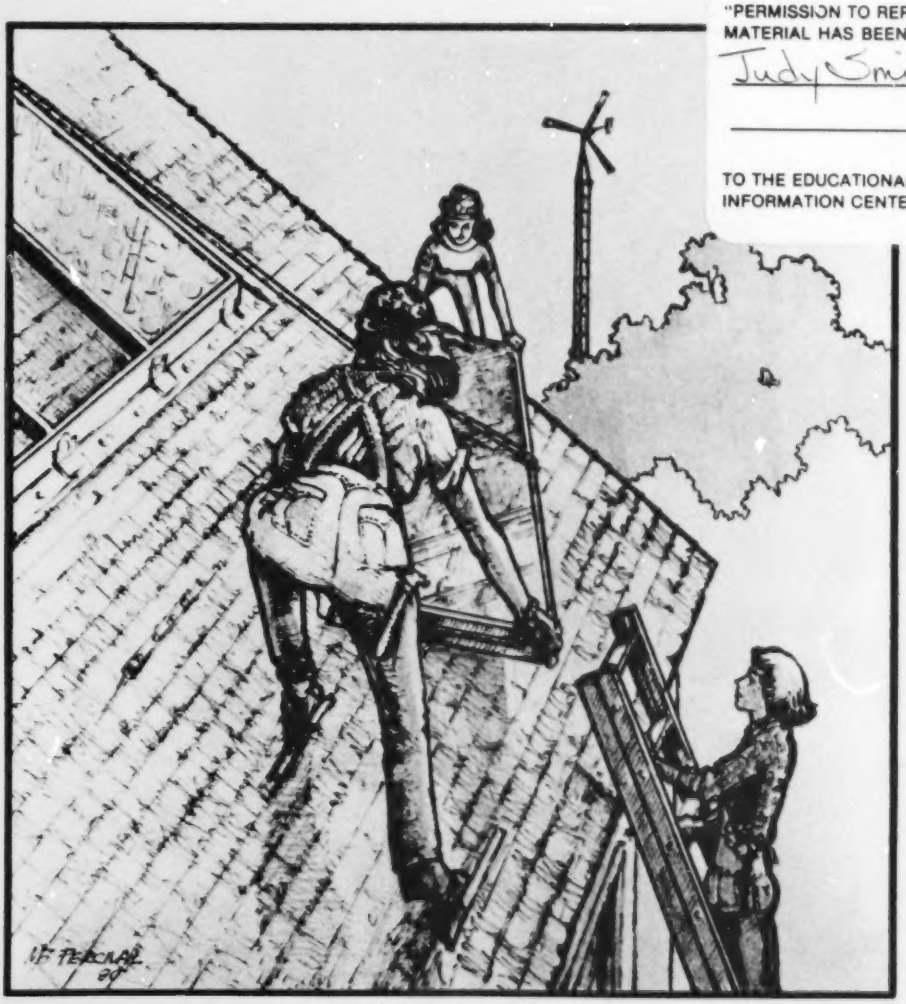

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Something Old, Something New, Something Borrowed, Something Due:

Women and Appropriate Technology

by Judy Smith

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Introduction

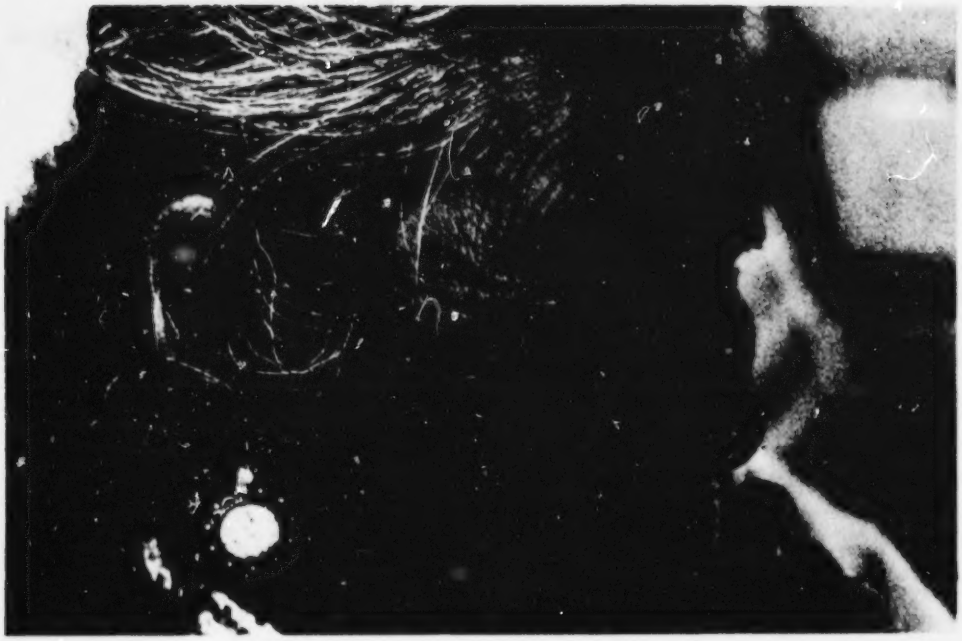
As energy becomes scarcer and more expensive, as the battle both for and against nuclear energy continues, as new technologies are being developed, it is critical that we begin to examine the effects of these issues on women's lives. Do they potentially limit or expand women's role in society? **Something Old, Something New, Something Borrowed, Something Due** examines these questions. Technology can only be defined as "appropriate" within a social context, and in **Something Old, Something New**, the author suggests that feminism can provide this social context and analysis.

First published in 1978 by the National Center for Appropriate Technology, **Something Old, Something New** began a discussion of women's role in appropriate technology (AT), of a feminist assessment of technology, and of efforts at coalition building between feminists and environmentalists and appropriate technologists. As Jan Zimmerman wrote in the introduction of the first printing, "This. . .focuses on the relationship of a particular population group to the development and implementation of appropriate technology. Women comprise a 51% majority of the population. To implement a technology without considering its impact on women or guaranteeing their participation in its development would condone sexist practices of existing patterns of technological development."

A conference, different publications and a network of women working with all levels of technology have evolved from the issues and concerns raised by **Something Old, Something New**. The Women and Technology Project coordinates these efforts. If you have any questions or comments for Judy Smith, or would like more information about the Women and Technology Project, we can be reached at: 315 S. 4th E., Missoula, MT 59801, (406) 728-3041.

I would like to thank all the people who helped make this project possible through their financial support and encouragement. They include Sue Armitage, Lynn Brown, Alanna Brown, Barbara Burke, Katherine and Peter Iverson, Judy Miller, Jan Zimmerman and the staff of Counseling and Educational Development Services, Inc.

—Kathleen Coyne,
Women and Technology Project
Missoula, Montana



We women had our children to care for, meat to cook and to dry, robes to dress, skins to tan, clothes, lodges and moccasins to make. Besides these things we not only pitched the lodges, but we took them down and packed the horses and the travois when we moved camp; and we gathered the wood for our fires too.

We cut good, lean meat into strips and dried it a little; then roasted it until it looked brown. After this was done, we pounded the dry meat with stone hammers that are found nearly everywhere. They were made by The-ones-who-lived-without-fire. Next we soaked ripe chokeberries in water, and then used this water to boil crushed bones. When the kettle of boiled bones was cool we skimmed off the grease from the bone-marrow, mixed it with the pounded meat, poured this into buffalo heart skins, and let it get solid...

Paint...we made hold its color with the gum, the water-colored gum, that one sees on chokecherry trees; and we used buffalo hoofs, too. We boiled them until they trembled (jellied), mixed this with our paint, let it dry, and then cut it into squares. Water of grease made the color come again from these squares, anytime after this was done

—Pretty Shield, Crow Indian, reported by Frank Linderman
in **Red Mother,** *John Day, 1932*

Something Old, Something New
Something Borrowed, Something Due:

Women and Appropriate Technology

Appropriate technology (AT) as a movement in the United States is very young and very diverse.[1] The prediction of ecological disaster and the back-to-the-land movement in the late 60's, along with the energy crisis of the 70's, provided impetus for a growing interest in smaller-scale, less energy-exploitive forms of technology.

Many groups around the country share this interest in working with innovative, ecologically-sound technology: small groups creating back-to-the-land lifestyles; community organizing groups working in economic development and community self-reliance; an increasing number of academically-based scientists and technologists; some large corporations; and the federal government. The goals and priorities of this diverse mix often are unclear, if not in conflict. Even their definitions of AT vary:

> "Appropriate technologies can be simply defined but not so simply created. They are small, conservative of resources, controllable and wise. They extend and deepen our own capabilities and experiences and unify them with those of others and with our surroundings."
>
> **Rain: Resources for Appropriate Technology**

> "...alternate ecological technology which would be labor-intensive and use local resources."
>
> Robin Clark, **Man-Made Futures**

> "The main goal of appropriate technology is to enhance the self-reliance of people on a local level."
>
> National Center for Appropriate Technology

The visible AT movement consists of a loose network of individuals and groups; a series of newsletters, access catalogs, how-to manuals and theoretical pieces; a national center, and a limited amoun of private and public grant money. Less visible is the diffuse audience of concerned individuals which comes into public focus on Sun Day and at other times of national or local organization. Almost invisible is the composition of that audience, many of whom are women. In the view of too many appropriate technologists, women merely receive provided services, rather than participate actively in the creation of alternative futures.

For the AT movement to succeed, it must begin to identify women as a necessary constituency and convince them that AT goals are compatible with women's own goals. Women, representing diverse class and ethnic backgrounds, total 51 percent of the population. They play an increasing role in social decision-making, pursuing non-traditional skills and seeking careers in new areas of knowledge. At the same time, women continue to fill the role of primary consumer in our economic system.

"The home's economic function today is primarily in the field of consumption."[2] One of women's jobs has been to exchange money for consumer items, such as food, clothing and appliances. Home-centered appropriate technologies, from solar hot water heaters to organic gardens, must present attractive options to women managing home consumption patterns.

Economist John Galbraith considers consumption to be women's major role in advanced capitalism.

> The decisive contribution of women in the developed industrial society is rather simple — or at least it becomes so, once the disguising myth is dissolved. It is, overwhelmingly, to facilitate continuing and more or less unlimited increase in consumption.[3]

In capitalist societies, an expanding economy traditionally has been seen as necessary for economic health. Economic growth requires not only increased production, but also increased consumption. Women administer this consumption.

Advertising is directed to women as consumption managers. If women become convinced that their families need new clothes, electric blankets, air conditioners, new furniture and three TVs, then they will buy new clothes, electric blankets, and three TVs. Corporations spend great amounts of money convincing women that they need energy-intensive, centralized technologies. Unless women perceive that it's worth their time to use less energy-intensive appropriate technologies, energy consumption patterns are not likely to change.

Women are a particularly important constituency for those groups attempting to interest low-income communities in AT. Two out of three persons living in poverty are women. Hispanic and black women have an even higher incidence of poverty than white women. Women headed 7.7 million of the 56.7 million families in the United States in 1976. One-third of the families headed by women are poor.[4]

In an article that calls for new consumer education for women, Margaret McCormack describes the poor woman's situation.

> For the poor woman, housing is a nightmare of hassling landlords, cold drafts, and unsafe heating. Her labor-saving "toys" are secondhand and rarely work. The food she must buy to feed herself and her children is expensive, without nutritional value, fattening, or carcinogenic. Her life may be threatened while trying to move around her neighborhood, city or between towns. Her car, if she has one, is a monstrous gas eater which rarely works.[5]

Appropriate technologies for weatherization, transportation and food production could help meet low-income family needs. However, AT proponents must interest and involve women from low-income communities in AT projects by demonstrating that AT can lower the cost of their survival needs.

> ...The housing in which many women live, due to inadequate insulation or construction, is an ecological disaster. Designed with goods consumption in mind, existing housing patterns isolate women in single units, each with its own washer, dryer, and so forth. Such isolation demands fossil fuel use for all of life's necessities, for communication.[6]

They are the primary victims of energy-intensive design, yet many low-income women do not understand the options for change that AT could offer them.

Like any newly emergent group "making it" in America, the few women with money often are eager to participate in the affluent, energy-intensive life style associated with suc-

In Canada's arctic climate, residents in provinces and the north already are facing another winter of critical fuel poverty. The price of heating oil in Nova Scotia and the Northwest Territories literally is out of reach of most residents. Fuel poverty hits hardest at the poor population, primarily older women, mother-led families and the working poor.

The low-income consumer, whether tenant or home-owner, lives in an energy-consuming dwelling with inefficient heating systems and home appliances, inadequate insulation and poor quality construction. In recent years, two very impressive projects have been started by women's groups to confront this problem.

Regina Native Women's Collective has conducted a major campaign to help native women become more aware of their right to decent housing. The collective formed its own community resource group to build co-op housing, using sweat equity. In addition, the group proposed to Saskatchewan Hydro that the collective become the demonstration project for energy conservation in the inner city.

Ottawa Community Council has developed a proposal for a total-support residential environment for single-parent mothers who are tired of poorly designed, high-rise, family public housing projects. The council has developed a major plan for a community of townhouse apartments with patched granny flats surrounding a food and household service centre. The object of this proposal is to build a community where some of the day-to-day chores and family responsibilities are shared by the residents, so that these mothers would have time for educational training and outside employment. The flats would be rented to older children, single working people, and older women who like children and want to participate in the shared community services. In addition, the Council proposes that the community grow much of its own food, recycle waste materials, and use Ottawa snow for its steam heating systems.

—Jan McClain, Director of the Housing Program
Canadian Council on Social Development

When I discovered appropriate technology, the prospects of achieving self sufficiency had a magnetic effect on me. Here at last, it seemed, was an "easy" way to reach some goals I've had for self improvement, better job opportunities, and a lot of fuzzy ideals about women's rights. Running a household as a divorced mother of two children had plainly illuminated the disadvantaged position in which I found myself.

Now, a year later, appropriate technology's promise to me is more clearly defined. AT people and workplaces are basically no different than any other, considering that all have been influenced by the same kinds of social factors. The progress women earn in our society will be just exactly that—EARNED. The appropriate technology movement is no safe harbor in which we can flourish and gain strength—without the hard work and heartaches involved in any worthwhile venture.

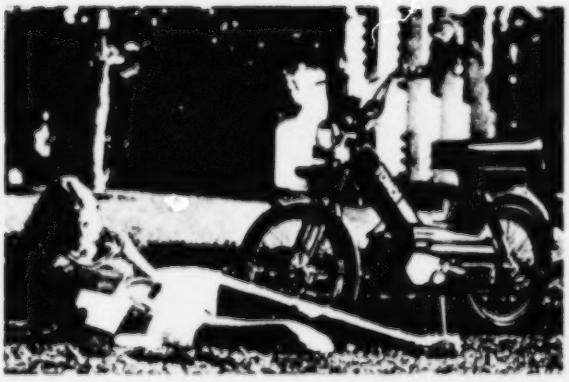
—Miese Holmes
Butte, MT

cess. They do so not in the traditional ways that wives of affluent men have participated, buying more and more expensive household items or moving into bigger and bigger houses, but in the ways of the **Esquire** or **Fortune Magazine** executive ideal — trips, cars and electronic gear.

Economically independent women show great interest in the energy-intensive consumer items and lifestyles which serve as traditional indicators of male success in United States society. In the last several years advertisers have begun to tailor ads to reach the growing female market for sports cars, airplanes, electronic equipment and recreation gear. Unless these women are convinced to use less energy-intensive technologies, this new market will continue to expand.

In the past women contributed little to technological decisions, but this situation is now changing. The number of women seeking scientific and technical training is increasing. Programs have been established to recruit women into traditionally male scientific and technical fields. This new group of women with scientific expertise could play a crucial role in determining whether the scientific establishment will support AT goals and projects.

Women, in their different roles, emerge as essential to the future success of AT. If they reject AT, or are simply disinterested, reorientation of America's dependence on energy-intensive technology will be very difficult to achieve.



TOMOS TOMOS.
It wants to be your sidekick.

Woman's Place in Science and Technology

Few women are involved in appropriate technology for the same reasons that so few women are involved in traditional science and technology. (Women make up 6 percent of all U.S. scientists with college degrees in natural sciences or engineering.) Science and technology are considered men's work in this culture. Women are not supposed to understand or even be interested in these areas.

Americans still give math and science toys to boys and dolls to girls. Boys' hobbies, books and magazines often relate to science. Girls' hobbies, books and magazines still deal mostly with clothes, dates and preparation for marriage and motherhood.[7] The few women who manage to pursue their interests in these "masculine" areas meet great resistance. Female expertise in traditionally male areas often is very hard for men, both in and out of scientific fields, to accept. Today women still receive less recognition for their scientific work, fewer grants, and lower salaries than men with similar training and experience.[8]

Most barriers to women in science and technology stem from the belief that a woman's brain is not suited for the pursuit of mathematics and science, and that her place is in the home. This belief has been used to deny women equal access to scientific graduate education as well as professional and policy-making positions.[9]

New research shows that girls like and do as well at math as boys until junior high school. Regardless of these findings, large numbers of elementary school teachers, counselors, parents and students themselves feel that boys are better than girls at math.[10]

Girls learn that math and science are not for them.[11] After junior high, when math becomes optional, girls begin to avoid math and consequently all fields that require a math background.

In a study done at the University of California at Berkeley in 1975, Lucy Sells found that 92 percent of the females and 43 percent of the males in the entering class were excluded from 75 percent of the major fields of study because they had avoided math in high school. The remaining 25 percent of the major fields

A good friend was in a managerial position for a branch of a large U.S. corporation. I approached him with my qualifications—a degree in the physical sciences from a major western university plus some pertinent experience.

Because of our friendship he was candid with me. Indeed he had an appropriate position open, but he was going to fill it with a man. However, and this is the kicker, he probably could get me a job in the typing pool. I have no doubt that he could. I don't know how to type, but then, he never asked!

—Name withheld

"Women are certainly capable of learning but they are not made for the higher forms of science..."

—G.W. Hegel, **Grundlinien der Philosophie des Rechts**, 1830

"We must start with the realization that as much as women want to be good scientists and engineers, they want first and foremost to be womanly companions to men and to be mothers."

—Bruno Bettleheim, MIT Symposium on American Women in Science and Engineering, 1966

Ellen Swallow and assistant sampling water.

"Do you know who first developed environmental studies and called it ecology?" (Female Instructor, Women's Studies)

"Gary Snyder?" (Male Professor, Wilderness Studies)

"No, Ellen Swallow, the first woman student allowed in MIT and the first to graduate with a science degree. She created an interdisciplinary environmental science. In 1892 she named it ecology."

"Never heard of her."

The science developed by Ellen Swallow encompassed environmental quality, including nutrition, air and water pollution, transportation, architecture, waste disposal and industrial health and safety. Since Swallow believed this science should be available to everyone, not just the educated few, she spent much of her time lecturing and setting up demonstration projects. The subsequent history of this science is all too familiar to students of women's history. Her science, practiced by women, was soon called home ecology and later home economics. It never achieved the status of other sciences, and today the scientific roots of home economics are rarely visible. In fact, many colleges and universities do not consider home economics sufficiently respectable academically to offer on their campuses.

No one talks of Ellen Swallow as the founding mother of ecology or environmental studies. She was a chemist on the faculty of MIT, yet her work rarely receives credit.

> An officer of the MIT Corporation recalled years later the tradition of long controversy with Miss Swallow, President Runkle and a few faculty members on one side, and the rest and all the Corporation on the other. "Why," (they) asked, "should a female take up scientific studies reserved for men? Woman's place is in the home...and if one woman is admitted, others will follow; and think of the disastrous effect on young men."
>
> Robert Clark, **Ellen Swallow, The Woman Who Founded Ecology**

MIT accepted Swallow as a special student but required her to study in a segregated laboratory. In 1876 MIT admitted more women, but it was 1883 before the college allowed them to study in the men's laboratory.

were the traditional subjects usually selected by women.[13]

Interviews with adult women show that regardless of general intellectual ability, many dislike and fear mathematics and avoid all endeavors that include math, such as science and engineering. Some women report anxiety whenever they see numbers, charts and graphs. These same women shared examples of messages received from parents, teachers, counselors or friends that women could not or should not do well in math.

Appropriate technology relies on math and science skills. Many men who work in AT have traditional science backgrounds. Others may not have formal training but have tinkered with tools and machines since childhood. Most women have had neither of these experiences. They lack formal or informal training in the use of tools, machinery or laboratory equipment. Often they encounter problems trying to find ways to learn these skills. Many apprenticeship programs are closed to women (women make up less than 2 percent of those in skilled trade apprentice programs), and few women are given entry level jobs in construction or carpentry.

Men working in AT share the traditional assumption that women can't do math and science. Others remain unaware of how very few women are exposed to necessary skills. Most male appropriate technologists do not realize that women are discouraged from learning AT skills. These assumptions blind men to women's needs for supportive learning experiences. Still others use the efficiency argument: men know how; so to save time (money), let men do it. Those who do recognize these problems are unsure how to solve them.

As a result, interested women often become alienated from the AT movement. Women who feel that AT is important cannot find the support or basic training in AT projects. Similarly, women interested in traditional women's technologies find no focus on these technologies in the AT movement.

Although few women are visible in the AT movement, a growing number of women are raising questions about women's role in science and technology. For example, members of the women's movement are aware that many major decisions facing society require know-

It is important to women who pursue technical careers to remember, for the sake of their sanity, that they are at a certain point in history. At some point in the future people will look back and believe that women always were able to pursue technical careers. But those of us who are living through the process of change know that it isn't happening overnight. We have nearly entered the stage of great promise. We have the right to participate, but not to suceed; the right to run twice as fast, sometimes just to stay where we are. Many highly competent women working in engineering and science have to sacrifice a portion of their right to "traditional success" because they are diverted from the basic right to pursue their chosen career.

—Sandra Hutchins, Ph.D.
Computer Engineer, San Diego, CA.

I teach a ten-week Alternative Energy Workshop. Women usually make up one-third of my class. They are better listeners, ask more questions, and are more practical than their male counterparts in applying renewable energy systems to their needs or their family needs. Most of the women show up for the tour of energy-efficient homes and for the construction project. But, tragically, very few women involve themselves directly in the construction aspects of the project.

Neither the women nor the men have much carpentry skill. Most are novices. All start on the construction project with a tool or task, but the women soon begin to fade from workers to watchers. This was the case when the class built a solar collector, a wind generator and a double barrel stove: the women mostly watched. Interestingly, when we built a solar oven and a food dryer, the women tended to be much more active.

—Scott Sproull, AERO West, MT.

ledge of science, and that women have little, if any, say in those decisions. Women recognize that they must enter technical fields to gain a voice in the decision-making process.[14]

To counter explicit problems with male control of medical technology, women are forming self-help health groups. They were spurred to action by the recognition that the medical establishment did not warn women of the dangers of birth control pills. These groups seek alternatives to drug-based technology, including herbal remedies, exercises for the relief of gynecological problems and home delivery without technical intrusion for low-risk mothers.

And a new element has appeared within the women's movement: a growing number of small groups interested in country living. Some began as groups of women from the back-to-the-land movement who met to talk about being women; others began as groups of women already involved in the women's movement who decided to move to the country to create a supportive, healthful environment. In these group settings women are learning self-reliance and skills from other women, in an environment far different in focus and tone than that of other back-to-the-land groups. Although they share similar concerns about ecology and appropriate technology with other groups, these country-based women choose to work with women in the women's movement.

One of these groups, which began as a consciousness-raising group for back-to-the-land women, now produces the magazine **Country Women** and in 1976 published **Country Women: A Handbook for the New Farmer:**

> In the country, there is room for a woman's renaissance. The space and time is there for a total redefinition of ourselves, our relation to the earth, our relation to each other. This has become very clear in the making of this book. We have the skills, the enthusiasm, the resources to build our dwellings, raise our food, take care of our most basic and real needs. This self-reliance fosters an incredible strength.[15]

Women always have been technologists: they developed the survival technologies of food gathering and preservation, shelter building, clothing production and healing. They produced their goods "to be of use" in daily life. The strands of these traditional "women's technologies" still twine through women's involvement in technology today, in gardening, weaving co-operatives, and the self-help health movement. But today, appropriate technologists refuse to validate women's skills, just as their ancestors centuries ago denigrated woman's creation of functional pottery and sewing utensils compared to man's production of religious icons.

It is frequently suggested or implied that the first tools were, in fact, the weapons of the hunters....However, since we really don't know what the early stone tools such as handaxes were used for, it is equally probable that they were not weapons at all, but rather aids in gathering. We know that gathering was important long before much animal protein was added to the diet, and continued to be important. If however, instead of thinking in terms of tools and weapons, we think in terms of cultural inventions, *a new aspect is presented. I suggest that two of the* earliest and most important *cultural inventions were containers to hold the products of gathering and some sort of sling or net to carry babies.*

—Sally Slocum
Woman the Gatherer: Male Bias in Anthropology, 1971

There are many women around me (in Mississippi) who would serve as models of executiveness anywhere. They do double duty, a man's share in the field, and a woman's part at home. They do any kind of field work, even ploughing, and at home the cooking, washing, milking and gardening. But these women have husbands; let me tell you of some widows and unaided women:

Mrs. Hill, a widow, has rented, cultivated, and solely managed a farm of five acres for five years. She makes her garden, raises poultry, and cultivates enough corn and cotton to live comfortably, and keep a surplus in the bank.

Mrs. Jane Brown and Mrs. Halsey formed a partnership about ten years ago, leased nine acres and a horse, and have cultivated the land all that time, just the same as men would have done. They have saved considerable money from year to year and are living independently. They have never had any expenses for labor, making and gathering the crops themselves.

Mrs. Henry, by farming and peddling cakes has the last seven years laid up seven hundred dollars. She is an invalid, and unable to work at all times. Since then she has been engaged in planting sweet potatoes and raising poultry and hogs.

—A letter from Miss Montgomery, the daughter of an ex-slave, to Frances Ellen Watkins Harper, black feminist writer and lecturer, 1878. "Coloured Women of America," Englishwomen's Review, January 15, 1878, pp 10-15, as reprinted in **Black Women in White America,** *Gerda Lerner, Random House, New York, 1972.*

Technology Necessary to Women's Autonomy

The role models for women provided by the AT movement are not very inviting. The back-to-the-land, long-skirted earth mother baking bread and feeding children in the kitchen doesn't attract much admiration from women interested in expanding their life options. This evokes images of stepping backward into rigid sex roles and sexual division of labor—a retreat from new options for women and a denial of the growing consciousness that housework should be shared by all who live in the house. Though women often enjoy participating in the traditional female technologies of food production, they want their participation to be by choice, as one option among many.

Certain high level technologies may be necessary for women's autonomy, and, if so, an emphasis on labor-intensive, decentralized technology could destroy women's chances to move out of their traditional roles. Some parts of the AT movement advocate abandoning centralized, energy-intensive technologies, while others prefer to maintain some of the technologies that characterize Western lifestyles. So far the effect of technology on women's role has not been included in AT theorists' determination of which technologies are appropriate.

One acquaintance, a female journalist with a small child, explains she will never give up synthetic fabric and go back to cotton even though it would save energy. She would have to iron everything and, with her young child, she already has enough trouble getting to work in the morning. Another refuses to give up her family's second car because, if she did, she would be giving up *her* mobility.

According to the U.S. Women's Bureau, a woman at home with one child already spends more than 80 hours per week on household chores while using labor-saving devices. Many might use some forms of appropriate technology, but few would be willing to expand significantly the numbers of hours they must work around the house. Recent interviews reported by Ann Oakley in **The**

Appropriate Technologies

Bio-Mass Conversion

Community Development

Composting

Energy Conservation

Insulation

Organic Gardening

Recycling

Small-scale Hydro Generators

Solar Greenhouses

Solar Hot Water Heaters

Solar Ovens

Weatherization

Windmills

Worm Growing

I recall watching college students bury a gas guzzling car on Earth Day '70 thinking that they had never raced in such a car to an emergency ward on the other side of town at 3 a.m. with one feverish baby in the front seat and its healthy sibling sleeping in the back seat. Nor did they have the harried daily routines of driving miles in one direction to the only available child care center, miles in another direction to get to work, back to the center before it closed, and off in yet another direction to pick up some food for dinner. Nor had they probably ever tried using bicycles to shop or do laundry with two kids in tow.

—Margaret McCormack, p. 18, footnote 5

Sociology of Housework document women's dissatisfction with housework's fragmentation, monotony, and isolation.

> The major finding here is that dissatisfaction with housework predominates. Seventy percent of the women interviewed came out as "dissatisfied" in an overall assessment of feelings expressed about housework during the course of a long depth interview. This figure lays to rest the ideas that only a tiny minority of women are discontented as housewives.[16]

Women working at home spend their waking hours washing clothes that will be dirtied, wiping floors that will get scuffed, cooking food that will be eaten, making beds that will be unmade.

DAILY CHORES

All the lamps were kerosene; we had to clean the chimneys (glass part), refill the kerosene and replace the wick.

We brought water from the well in a yoke carrying buckets. Lighting the samovar for tea meant stoking coals in a piece they called the chimney in the center of the samovar. It took half an hour to an hour for the coals to get hot and then another half an hour for the water to get hot enough to make tea.

WEEKLY CHORES

Baking bread: We used 30 to 40 pounds of flour in a big tub. First we had to sweep the oven floor because we put the bread right on the oven floor; the oven was built into the wall about three feet up, so we used long sticks with a sort of spatula on the end and shoved in the loaves. JOKE: A young wife, who is kneading bread in her husband's house, meets her husband's mother for the first time. She is dripping and pouring with sweat and she aks her mother-in-law how long she is going to have to knead the bread. Her mother-in-law says, "Until that post gets wet."

Washing clothes: We would heat water and pour it into a big wooden tub about four feet in diameter and take wood ashes from the oven and wrap them in a cloth and put it in the water to soften the water; we used bar soap (plain yellow soap). We would rub the clothes together and wash them twice and then take them to the river to rinse them, and beat them with a stick to get more dirt out. In the winter time, when the river was frozen over, we had to cut a hole in the ice; my hands used to get so numb that I used to take a pitcher of hot water with me so that I could dip my hands into the hot water to get some feeling back in them. To dry the clothes I had to hang them up in the attic and they would take a week to dry between freezing and thawing until dry. To iron I would put coals inside the iron, so I would heat the coals first to put them in the iron. We also had irons that we stuck in the oven to heat. We had a wood floor, but some people had dirt floors, so they had to pat lime on it once a week with their hands to seal the floor; they had to use their hands—there were no tools—to keep the dirt from coming up.

—Priva Alper, 85
Los Angeles

Women homesteaders cooked on a woodstove, washed clothes with a scrub board in large black pots over fires in the yard, made clothing, bedding and quilts by hand, grew vegetables and put them up for the winter, raised chickens, churned butter and used the egg and butter money for store-bought necessities. They also worked in the fields when necessary. There are instances of single women and widowed women with children coming to Montana and proving up homesteads.

—Montana Women's History Project

It isn't fair

—the way the work of the human race is proportioned out and distributed.

Look at the drudgery of washing clothes and cleaning house. Compare it in its hardness and wearingness with the occupations of most men! The only way out of it is to use **Pearline.**

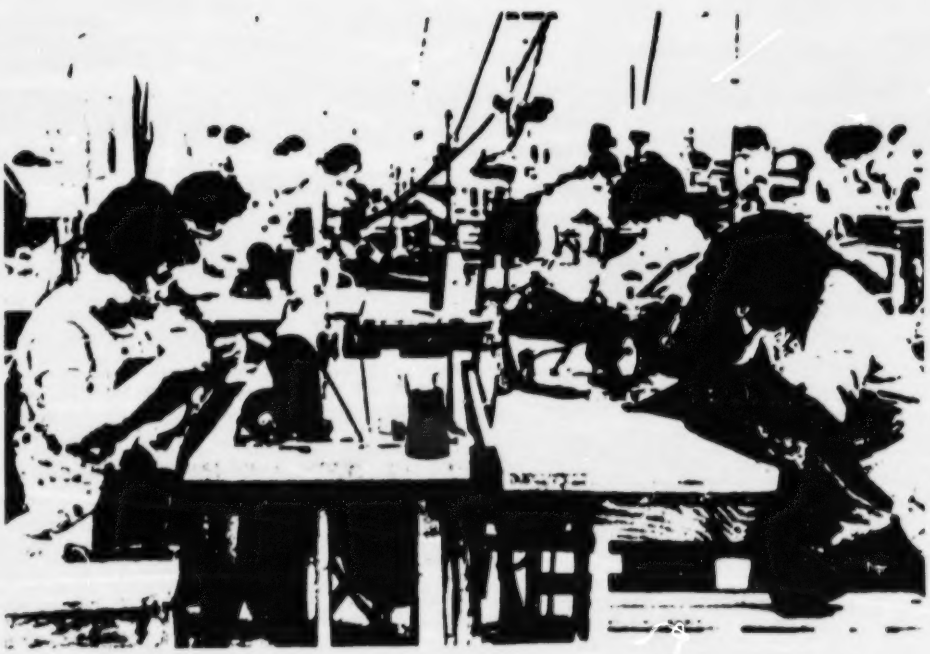
Use Pearline and take the drudgery away from housework. Pearline makes woman's work womanly and healthful and fit for her to do. All the washing, all the cleaning, and hundreds of other things besides, are made easy with Pearline.

Millions USE Pearline

1897 Ad

A growing number of women want and need to work outside the home; many are single heads of household. The U.S. Bureau of Labor Statistics projects that by 1990 nearly two-thirds of women ages twenty to thirty-four will be employed outside the home. Many of these women consider labor-saving technology essential to their ability to pursue dual roles or have two-career families. More and more women use fast foods, perma-press fabrics and energy-intensive appliances to minimize the time they must spend after they come home from work, on their second job—that of keeping house.

Most of these women work outside the home as clerical, service and household workers, averaging $66 to $111 per week in full-time pay.[17] A household worker "after her 8-hour day of cleaning up other people's dirt, looking after other people's children, and cooking other people's food" has little time or energy for her own household tasks.[18]



Theorists in the women's movement assert that other recent technological innovations have been one of the major forces in changing women's role in our society.

> Today, technological conditions have dramatically developed, creating the objective conditions required to enable women to assume roles of complete equality with men in all fields. Much of the drudgery of housework has been replaced by factory-produced equipment and supplies; prepared foods, diaper cleaning services, house-cleaning and clothes-washing machinery have, for those who can afford them, sharply reduced the time needed to do household tasks. Likewise, technology has permitted a new division of labor in which much of the formerly heavy manual labor done by men is done by machines which both men and women can run.[19]

Certain levels of machine technology are necessary for women to expand their job options. Machinery that reduced the need for strength in traditional male jobs opened positions to women; it is one reason that sex can be challenged as a *bona fide* qualification for many jobs. If the AT movement advocates a return to manual labor, some people will consider women unable to compete for the non-traditional jobs they now hold.

Many women see the recent creation of effective contraceptive technology as a necessary condition for women's autonomy. This technology has succeeded in unknotting the previously inextricable tie between female sexuality and reproduction. The importance of cutting this knot has been recognized by women in all cultures.

In addition to granting personal autonomy, the advent of effective contraception in the last 15 years has allowed women the power of reproductive control and family planning. Because of this technology women are able to limit and space their child-bearing. As a consequence, the fertility rate in the United States has fallen steadily, and some experts predict that negative population growth will be achieved by 2020.[20]

Effective birth control is a sophisticated, centralized, energy-intensive technology. Synthetic hormones are manufactured,

Native American women traditionally practiced a variety of birth control methods, which some tribes condemned and others condoned. The Paiute believed future pregnancy could be avoided if they buried the placenta of a recent pregnancy upside down. Apache maidens who did not wish to bear children had an old medicine woman perform a ritual at the onset of menstruation. Quenault women brewed an abortive from a thistle plant; Salish women made a contraceptive of doghane roots and water. "Obviously, many of these contraceptive measures failed and when this happened there wasn't much a woman could do except try another herbal remedy or beat herself on the belly with stones."

—Carolyn Niethammer, p. 18, footnote 26

packaged in a pill that reliably releases a certain hormone dosage, and marketed through a national distribution system.

Natural birth control, considered an appropriate technology alternative, relies on knowledge of body cycles and abstinence during fertile periods. It works for some women but not for others. The failure rate has been estimated as high as 25 percent.[21]

Although there are health risks associated with the oral contraceptives now available, few women are willing to give up the technology necessary for effective birth control. The women's health movement is calling, instead, for money for research into a more sophisticated technology that can provide safe as well as effective contraception for men and women.

As women analyze the relative impact on their lives of high and low energy-intensive systems, they will need to set their own priorities for technological development. To ensure that these priorities receive full consideration, in spite of pressures to reduce energy consumption, women will have to become involved in all phases of appropriate technology from policy planning to invention and application.

Appropriate Technology: a Male Enterprise

"Most of the horticultural and environmental positions in New York City are held by women. This is because they are low-paying jobs and do not represent a threat—they are only extensions of cleaning house."

—Name withheld
New York City

The AT movement appears to be a sex-role stereotyped movement relying on male expertise. Men do men's work and women do women's work. Men do the construction and invention. Women do clerical tasks and make the coffee.

Most of the attention on appropriate technology focuses on the traditionally male technologies of energy and transportation, rather than on traditional female technologies of food preservation and clothing production. Although women have a long history of involvement with survival technologies, their contri-

butions are overlooked in a society which values external success-linked technologies of engineering and science.

Pick up an AT publication. What kinds of technology does it feature? How many pages are devoted to women's work? How many to men's work? How many to the idea that anyone can do either men's or women's work? Who writes the theoretical articles and the editorials? Who edits the articles and does the distribution? Whose pictures are included?

Look in the ecology section of a good book store. Out of over seventy-five titles reviewed, women authored only three and three others had women among several authors or editors. Appropriately, the authors of the thirty-eight articles in the book **Man-Made Futures: Readings in Society, Technology and Design**, were men.[22] The great majority of articles in all the collections were written by men.

Who's in the movement anyway? Who are the experts? The founding fathers? Who's deciding what is appropriate? Who talks at meetings, gets the grants and does the inventing? Who's on the tech staff and who's on clerical? **The Directory of Appropriate Technology Activities and Projects** lists only male inventors.[23]

Visit an AT project. Who works on the solar collector? Who cans food in the kitchen? Which technology is pointed out with pride? How much time is spent encouraging and training women to do men's work and vice versa?

"But it's not efficient."

"Women aren't mechanical."

"It would take too much time to show a woman how to build a solar collector, work on a car, use the tools..."

Of course exceptions exist to all generalizations. A few periodicals make special efforts to include women's concerns and activities in their issues.[24] A few projects have women working in non-traditional areas.[25] Some branches of the AT movement are more open to women's equal participation than others.

Comparatively, a large number of female experts are active in the field of AT agriculture. Organic agriculture was long ignored by the male agricultural establishment, leaving a professional niche vacant for women to occupy. Women's involvement with agriculture is as

In our conversations with rural women, we found that for many, the only technology they use is 'appropriate technology.' However, rural women do not necessarily see this as a virtue. They seem to have been imbued with the idea that they should have *more washing machines, clothes driers, power driven rototillers,* etc.; *and will 'apologize' for not having them.*

If society would value their skills and use of 'appropriate technology' rural women would be reinforced in their traditional behavior, thereby raising their self-esteem and reducing their orientation to increased consumption.

—Corky Bush
Rural Women's History Project
Women's Center
University of Idaho

The utilities are already planning for the blackouts. They're going to come. And women have to ask themselves: 'Will you be able to put anything in the freezer and not have it spoil?' If you can't we'll have to resort to grocery shopping every day. And as for myself, I'm not crazy about going back to the 'good old days.'

—Diane Haelsig, regional Nuclear Energy Women (NEW) coordinator, quoted in the Seattle-Sun.

old as agriculture itself. Originally gatherers, women became sowers and reapers with the discovery of natural wheat. Once nomadic cultures succeeded in domesticating animals, they settled into site-based patterns of civilization in which men retained the powers of law-making and prayer-speaking.[26]

As technologies changed, so too did women's roles. Once co-equal workers on family farms, women were displaced by the introduction of farm machinery. The industrialization of farming radically altered definitions of appropriate female activities.[27] It is these relatively recent role definitions which carry over dangerously into the development of alternative technologies.

With certain exceptions, the AT movement is a male-dominated movement reflecting very traditional attitudes toward women and women's work. Women are a distinct population with specific needs and interests to be served by AT, but their involvement is not actively encouraged. The AT movement does not yet reveal an awareness of women's emerging aspirations or a commitment to change old sex-role stereotyped attitudes and behaviors in orde- to create a non-sexist future in which people are treated as individual human beings.

As an organizer of conferences on food issues, I often look for women to be speakers or resource people. Sometimes I have a hard time finding women who have a reputation. What I find is that women are doing much of the work that really counts in terms of community organizing, networking and program development, but they do not have big names that draw for a conference. Usually it is men who are the directors of the organizations, the university professors, or the authors of books, but it is women who do most of the research, develop the programs, or manage the actual production. To have these women involved as resource people or speakers, I had to reorient my thinking away from big names and big titles toward people who are actually doing the job.

—Eleanor McCallie
Earthwork, San Francisco

A Case for Mutual Needs

Whether the AT movement and the women's movement can work together will depend on the abilities of each movement to articulate clearly its goals and visions for the future.

An organized women's movement with an extensive communication network has emerged in the United States. The members of this movement represent a large pool of resources and talent dedicated to social change.[28] The women's movement, like any movement of emergent people, focuses on achieving decision-making power for its members. It demands that women have equal access to and power within social, political and economic institutions.

The movement also calls for a non-sexist future when people treat each other as individuals. However, to reach this goal, discrimination and prejudice about "woman's place" must be removed. Though women are interested in non-traditional roles, they also demand that traditional female interests and abilities be valued equally with traditional male interests and abilities.

The memberships of both the women's and the AT movements share similar cultural backgrounds and similar values of individual choice and social responsibility. Both are attempting to develop alternatives to top-down forms of organization and communication. Both dream of futures in which people have personal control over their life decisions.

The goal of women gaining power in society need not diverge from appropriate technology's goal of developing decentralized, low-energy pathways. If each movement can identify values and visions it shares with the other, the two movements will be able to pool resources and skills. This can happen only if each movement learns to respect the legitimacy and value of the other's purpose.

Rosemary Radford Reuther, a feminist theologian and philosopher, in her book **New Woman/New Earth**, stresses the importance of an egalitarian, communitarian, and ecologically-balanced world.

"The two strongest movements in the country today are feminism and environmentalism and we have to get them together."

—Mary Appelhof

Women historically have perceived that they do not have the tools to adequately understand the energy implications of their buying habits or behavior. They often don't know what an EER (Energy Efficiency Rating) is on an appliance they buy. Or they don't think about energy efficiency when buying a home. Or they don't understand overpackaging, or the energy implications of the food or clothing they buy. Women play an instrumental role in managing family budgets and could be very effective in reducing energy use in the residential sector. But first, energy must be de-mystified for women.

—Maura O'Neill, assistant director of Consumer Action Now (CAN), Copyright, 1979, Los Angeles Times Reprinted by permission

> Women must see that there can be no liberation for them and no solution to the ecological crisis within a society whose fundamental model of relationships tends to be one of domination. They must unite the demands of the women's movement with those of the ecological movement to envision a radical reshaping of the basic socioeconomic relations and the underlying values of this society. The concept of the domination of nature has been based from the first on social domination between master and servant groups starting with the basic relation between men and women.[29]

So far the question of energy consumption and reliance on large-scale, exploitive technology has not received significant attention in the women's movement. In fact, several feminist writers see a need for specialized technologies to end sex-based differences.[30] Since women want equal power with men, a simplistic analysis could result in a demand for an equal piece of the energy pie. But if energy consumption and environmental destruction are not curtailed, the resulting ecological crisis could cost women all the gains they have made in the last 100 years. In times of scarcity, as the depression in the 1930's demonstrated, reversion to a sex-based, rigid division of labor occurs.[31] Women lose their jobs first in times of declining production.

If the use of remaining energy sources and the development of new ones is not carefully planned, technologies, such as contraceptive ones, that specifically benefit women, may not be available in the future.

Some voices within the women's movement raise ecological concerns and advocate ecologically-sound futures. Marge Piercy in **Woman on the Edge of Time** creates a future society with mixed levels of technology. She describes small, interdependent communities that rely on local materials, labor-intensive technologies and a wide variety of energy-generating devices. Energy-intensive technology is used only when unavoidable or when considered socially necessary. Neither sex has children: children are conceived through extutero technology and adopted at birth by three adults. However, this society is threatened by another, totally mechanized society which

Something I see as necessary is a radical decentralization of society into smaller communities. Economists and technologists disagree about how to organize a high technology into smaller social units, but some think that you can, particularly with new forms of energy and agriculture. If people were living in groups that were interdependent economically, or in their common attachment to an enterprise or a place, they could approximate networks of "relatives" in a way they can't at present. It's not a question of blood relation versus *voluntary association. All associations splinter when there's nothing holding them together but a fragile compatibility among the individuals. When there's some* external *thing holding people together, then there'll be something like a generation-spanning, human-size social base for the life of the individual.*

—Dorothy Dinnerstein, psychologist
Ms, August, 1978, p. 90

exists on a ravaged earth and allows women no freedom. In her book Piercy makes it clear that unless a choice between these futures is made now, a decentralized, ecologically sound future cannot be assured.

The integration of priorities is a major stumbling block for coalitions. Too often women have been asked to give up their priorities when working in coalition. Women's demands have been seen as trivial by some

Plan for Action

I. Discuss the issue and encourage the elimination of sex-role stereotyping within the AT movement. All AT groups, projects and publications need to develop a stated commitment to a future in which people are treated as individuals rather than as sex stereotypes.
II. Recognize that women's specific historical experience placed them as a group in a limited and less-valued role. AT groups and projects need to take steps to develop female expertise in AT.
    A. Set up training programs and apprenticeships for women to learn necessary skills including use of tools and machines.
    B. Encourage women to take positions of responsibility and decision-making.
    C. Place equal emphasis on female technologies and equal value on expertise in these areas. Encourage male expertise in traditionally female technologies.
    D. Foster the development of women's groups and networks interested in AT.
III. Recognize women's traditional alienation from science and technology. Set up an educational program to interest women in AT.
    A. Discuss in all educational programs the implications of AT for women working in and out of the home. Advocate social policies that expand rather than restrict women's options.
        1. Advocate the end of the sexual division of labor.
        2. Advocate sharing of housework by all who live in the house.
        3. Advocate socializing of housework so that housework is seen as a skilled job and people receive compensation for providing essential services.
        4. Advocate maintaining and improving certain technologies that foster women's autonomy, for example, contraceptive technology and labor-saving home technology.
    B. Develop AT-based math and science programs for women.
    C. Use women role models in educational projects and publications.
IV. Encourage government programs that seek to remove barriers to women in science and technical fields including loan and grant programs and special skill learning programs.
V. Develop a communication network with the various facets of the women's movement and work toward a future coalition. Consider ways to incorporate AT and women's movement goals and priorities.

movements for social change, and as too controversial by others. For example over 100 years ago the women's movement worked with the abolition movement. They sacrificed their priority of women's suffrage because it was considered too controversial. After Negro suffrage, the abolition movement promised, women's suffrage could be attained easily. However, after passage of the 14th and 15th Amendments, the abolition movement disappeared. There was never a significant effort by more than a few abolitionists to promote women's suffrage. To achieve the right to vote, women worked alone for another 50 years.

The women's movement must honor the urgency of ecological concerns and work to develop an awareness in women of the need to support the development of AT, but the AT movement must also recognize and facilitate women's equal role in deciding what AT is and how it will be implemented.

If these movements fail to cooperate, the beneficiaries will be those interests now dominant in our society. The fragmentation of social change movements always hinders the mobilization of enough bodies and resources to seriously challenge the *status quo*.

For the women's movement and the AT movement to work in concert, they must integrate each other's priorities without sacrificing one set for the other. If dichotomies are established, then neither will benefit from the other's resources and energy, nor, in the long run, be able to create the future society it envisions.

Given the long history of sexism in this culture it is not clear that the basically male appropriate technology movement will be able to accept the priorities of the women's movement. One thing is certain: coalition is possible and desirable only if both movements recognize it as the path that leads to the greatest potential for a non-sexist, ecologically-sound future.

The future of the environmental and feminist movements are interrelated. It is impossible for more appropriate technological innovations to prevail without dealing with social issues. Likewise, feminists will not succeed in accomplishing their social goals if they do not help create the technologies which will best accommodate those goals.

—Melissa Young, Seattle Washington

Resource List

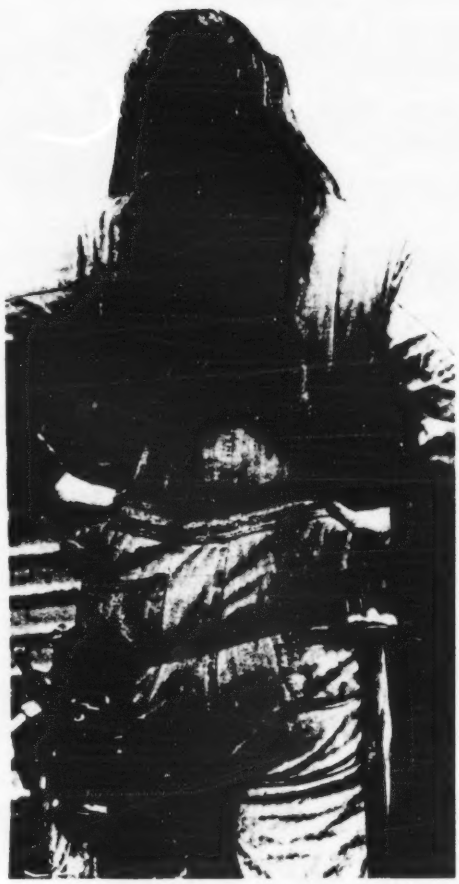
ORGANIZATIONS

Center for Science in the Public Interest
1779 Church St. NW
Washington, D.C. 20036

National Center for Appropriate Technology
P.O. Box 3838
Butte, MT 59701
NCAT acts as a national clearinghouse for AT information, including an extensive library and publication of materials.

National Women's Health Network
1302 18th St. NW
Washington, D.C. 20036

Women and Technology Project
315 S. 4th E.
Missoula, MT 59801



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FOOTNOTES:

1. Appropriate technology, however, is old. Traditional Native American cultures, for example, used a wide variety of appropriate technologies.

2. J. Bernard, **Women and the Public Interest**, Aldine, Chicago, 1971, p. 72.

3. J.K. Galbraith, **Economics and the Public Purpose**, Houghton-Mifflin, Boston, 1973, p. 33.

4. National Commission on Working Women, "A Few Facts About Working Women," 1978.

5. M. McCormack, "A Feminist Perspective," **Social Policy**, Dec. 1977, p. 18.

6. McCormack, Ibid.

7. M. B. Strauss, "Wanted: More Women in Science," **The Amer. Bio. Teacher**, Vol. 40, No. 3, 1978, p. 181; L. Weitzman, "Sex Role Socialization," in **Women: A Feminist Perspective**, ed. Freeman, Mayfield, Palo Alto, 1975.

8. The treatment of Rosalind Franklin by Watson and Crick in their efforts to justify their taking her data is documented in Anne Sayre's **Rosalind Franklin and DNA**, W.W. Norton, New York, 1975. See Ruth Hubbard's review in **Signs**, Vol. 2, No. 1, p. 229. For information on the disparity in grants and salaries see "Women in the Natural Sciences," B.M. Vetter, **Signs**, Vol. 1, No. 3, p. 713.

9. Vetter, op. cit.

10. J. Ernest, **Mathematics and Sex**, University of California at Santa Barbara, 1976.

11. Ibid.

12. L. Sells, "High School Mathematics as the Critical Filter in the Job Market," in **Developing Opportunities for Minorities in Graduate Education**, Proceedings of the Conference on Minority Graduate Education at the University of California, Berkeley, May 1973.

13. Successful programs are available to help women get over math anxiety and to encourage girls to pursue math-related careers. Two that are well known are Wesleyan Math Anxiety Clinic at Wesleyan University and the Equals Program at University of California at Berkeley.

14. Women's caucuses have formed in the scientific professions. The National Women's Studies Association is establishing a task force to study the issues involved and make policy recommendations.

15. J. Tetrault and S. Thomas, **Country Women: A Handbook for the New Farmer**, Anchor Books, New York, 1976, p. xv.

16. A. Oakley, **Sociology of Housework**, Random House, New York, 1974, p. 182.

Please send me information on the Women and Technology Network. I have enclosed a self-addressed stamped envelope.

Please send me _____ copies of *Proceedings: Women and Technology: Deciding What's Appropriate*. I have enclosed $2.00 + .50 postage for *each* copy ordered.

Please send me information on ordering *Something Old, Something New* in quantities of ten or more.

Name _____

Address _____

City _____ State _____ Zip _____

17. National Commission on Working Women, op. cit.

18. K. Shortridge, "Working Poor Women," in **Women: A Feminist Perspective**, ed. Freeman, Mayfield, Palo Alto, 1975, p. 243.

19. A. Seidman, "Women Who Work for Wages," in **Beyond Intellectual Sexism**, ed. Roberts, David McKay, New York, 1976, p. 265.

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21. L. Mastroianni, "Rhythm, Systematized Chance Taking," **Family Planning Perspectives**, Vol. 6, p. 209.

22. **Man-Made Futures**, ed. Cross, Elliot and Ray, Hutchinson, London, 1974.

23. E. Eccli, **Directory of Appropriate Technology Activities and Projects**, National Science Foundation, available from National Technical Information Service, Document Sales, U.S. Department of Commerce, Springfield, Virginia 22161.

24. **Work Book** has a regular section entitled "Women"; **Cascade** has a "Women's and Men's Liberation" section.

25. See the directory in this publication.

26. C. Niethammer, **Daughters of the Earth: The Lives and Legends of American Indian Women**, Collier, New York, 1977, p. 18.

27. The long-term effect of industrialization on women's roles in the U.S. is under study. Some practitioners of women's history see the growth of machine technology as expanding women's options; others see it as creating yet another bondage. See Ruth Schwartz Cowan's "A Case Study of Technology and Social Change: The Washing Machine and the Working Wife" in **Clio's Consciousness Raised: New Perspectives on the History of Women**, ed. Hartman and Bonnet, Harper and Row, New York, 1974, p. 245.

28. This paper does not attempt to discuss in detail the future visions of the diverse groups that make up the women's movement. It offers certain useful generalizations.

29. R.R. Reuther, **New Woman/New Earth: Sexist Ideologies and Human Liberation**, The Seabury Press, New York, 1975, p. 204.

30. In **Dialectics of Sex** (Bantam, 1970) S. Firestone advocates a system where neither women nor men would have babies. Fetuses would be carried in mechanical wombs and then adopted by a number of adults who made up an intentional family. J. Russ in the **Female Man** (Bantam, 1975) writes of societies where women have implanted steel fingernails and teeth in order to overcome men's physical advantage. She also discusses alternative modes of reproduction that would require energy-intensive technology: ova fusion and parthenogenesis.

31. B. Millstein and J. Bodin, **We, the American Women**, Science Research Associates, Chicago, 1977, p. 228.